Encyclopaedia of Antibiotics

by John S. Glasby
John Wiley and Sons; London, New York, Sydney, Toronto, 1976
372 pages. £17.50, $39.00

Encyclopaedia of Antibiotics, compiled by J. S. Glasby, is intended to provide a reference text for workers in organic chemistry, biochemistry, medicine and microbiology and in addition it could prove useful for practising pharmacologists. The author includes in his survey substances derived from or produced by a living organism and capable of inhibiting the life processes of microorganisms when present in small concentrations (Benedict and Langlyke), substances obtained from plants and higher organisms which possess antibiotic-like properties and substances active, almost exclusively, against carcinomas where no direct action due to microorganisms has yet been conclusively proved. The text of 372 pages lists in the region of 1500 antibiotics and one must congratulate the author on even attempting what must have been an arduous task of compilation. It is a sobering thought that as the author himself observes the text, although very comprehensive, inevitably has many omissions particularly since new antibiotics are constantly being discovered.

When first presented with such a lengthy choice of compounds it is perhaps natural to look up an antibiotic with which one is familiar in an attempt to assess the criteria used for the purpose of selecting and describing a given entry. Reference to chloramphenicol, for example, reveals the chemical structure of the compound, a description of its source and preparation and many chemical and physical properties possessed by the drug. Information is provided concerning which bacteria are inhibited by chloramphenicol and what antibiotic concentrations are required to produce an inhibitory response. It also becomes apparent from the text that the drug is effective versus Rocky Mountain spotted fever and may well afford protection against *Dermocentroxenus rickettsi.* So far so good for the organic chemist, the microbiologist and possible the medical gentleman. Sadly, however, the latter and the pharmacologist can not learn from the text of the known toxic side effects of this drug on bone marrow, occasionally seen during or following treatment of patients with chloramphenicol, but instead we are told that no toxic symptoms occur when patients are given a single dose of 2 g or 1 g daily for 10 days. It is likely too that many biochemists would be interested to know that chloramphenicol is a most effective inhibitor of the peptidyl transferase centre of bacterial ribosomes – this being its main site of action and providing the reason for the specificity of the drug as an inhibitor of bacterial cells since no corresponding inhibitory action is observed on ribosomes from eukaryotes.

With tetracycline we are indeed told of the side effects that this antibiotic can induce when administered in attempts to control bacterial infections. But the biochemist is again left largely to ponder unaided although it is well known that this drug inhibits the binding of aminoacyl-tRNA to ribosomes from both pro- and eukaryotic cells. Tetracycline is an effective and specific antimicrobial agent only because fortuitously it can penetrate animal cells only poorly whereas it is rapidly and actively transported into intact bacteria to give a high intracellular concentration.

It could be argued of course that detailed descriptions of the mode of action of antibiotics at the molecular level might interest only a few specialists in this field despite the fact that such knowledge has often provided the basis for a rational chemotherapy involving design and use of new antibiotics. The point in question does, however, serve to illustrate a certain inconsistency apparent within the text of this encyclopaedia. For example, with actinomycin D, admirably the relevant passage describes details of how this drug intercalates with DNA and in doing so inhibits DNA-dependent RNA synthesis and the section on this drug closes with the citation of no fewer than 75 references. As the author says actinomycin D is an effective

antitumour agent particularly in the treatment of a renal tumour in children (Wilm's tumour) but it must be admitted that its clinical use is very limited and the main interest in the drug stems more from its use as a research tool to probe the mechanism of DNA-dependent RNA synthesis. This lack of balance in the text is also apparent elsewhere. Thus for gougerotin, a drug of little or no use clinically and poorly characterised biochemically, the short description does tell us that the antibiotic inhibits protein synthesis by preventing transfer of amino acids from aminoacyl-tRNA into polypeptide. In contrast, although penicillin was the first antibiotic to be discovered and used and still remains unrivalled for treatment of bacterial infections in general, we are told nothing concerning its mode of action involving interference with the correct assembly of bacterial cell walls and the reference list provided is brief, particularly in relation to that cited for actinomycin D. In short a reader who wishes to refer to a given antibiotic in this volume may or may not find the information he seeks.

Despite these rather specific criticisms, which I am of the opinion do cause an unfortunate lack of consistency in the coverage of the drugs selected, the volume has been compiled with great care and the presentation is very clear. The names listed are often splendid with such gems as jolipeptin, kuwaitimycin, bramycin and virginiamycin to name but a few. What a disappointment to find 305 drugs called simply antibiotic, the name accompanied by letters or numbers or both. Perhaps in some cases the original (exotic) Japanese nomenclature has no corresponding English equivalent. It is fascinating to flip through the pages of this encyclopaedia and note the vast structural variety and complexity illustrated by the antibiotics selected. This aspect is surely the strength of the encyclopaedia as a reference book and having examined some of the structures depicted in detail I for one am anxious to obtain many of these compounds with a view to carrying out further biochemical analysis. Such studies must surely give a wealth of information concerning structure–function relationships in the antibiotic field and it may be that a future massive volume compiled by the present author could incorporate many remarkable but hitherto undiscovered facts concerning the modes of inhibitory action of many of the compounds presently listed.

Michael Cannon

Handbook of Intermediary Metabolism of Aromatic Compounds

by B. L. Goodwin
Chapman and Hall; London, 1976
ix + 785 pages. £30.00

The metabolism of aromatic compounds is of considerable intrinsic interest and importance since the metabolic reactions include the biosynthesis or degradation of a variety of different biologically important compounds, such as the aromatic amino acids, some hormones particularly catecholamines and thyroxine, and foreign compounds, including many drugs and carcinogens. Although there are a number of excellent reviews covering these topics, this comprehensive treatise is a useful reference book, which can be used readily as a guide to the original literature on the intermediary metabolism of aromatic compounds.

The book is divided into two sections. Part I (137 pages) covers briefly the main reactions and enzymes, grouped together under convenient headings such as 'Reactions involving the formation and degradation of the aromatic nucleus and other ring systems' and 'Formation and degradation of side-chains'. In part II (648 pages), some 7000 aromatic compounds are listed alphabetically with information about their precursors and/or degradation products. In the latter case, the species in which the relevant reactions have been